

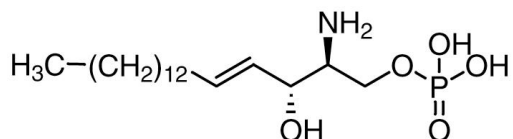
Product Information

Sphingosine 1-phosphate

Product Number **S 9666**
Storage Temperature $-20\text{ }^{\circ}\text{C}$

CAS RN: 26993-30-6

Product Description



Molecular formula: $\text{C}_{18}\text{H}_{38}\text{NO}_5\text{P}$
Molecular weight: 379.47

Sphingosine 1-phosphate (S1P) is prepared enzymatically by reacting sphingosine phosphorylcholine with phospholipase D. Only the monophosphate product is obtained with no formation of the diphosphate product. This product is presumed to be a mixture of L-threo and D-erythro forms, according to the procedure used to prepare the product.¹

S1P is a bioactive sphingolipid metabolite that is known to mediate diverse cellular responses including cell growth, survival and migration. Most of these effects have been attributed to its binding to a specific subfamily of G-protein-coupled receptors.²

Sphingosine 1-phosphate mobilizes intracellular calcium in U937 cells and activates the transcription factor NF- κ B in these cells. The S1P-induced NF- κ B activation was blocked both by cyclosporin A and butylated hydroxyanisole.³

S1P-dependent signaling serves as an important regulator of smooth muscle contraction.⁴ It has been demonstrated that S1P induces rapid and transient tyrosine phosphorylation of epidermal growth factor receptor (EGFR) and c-Met in gastric cancer cells.⁵ S1P was found to reduce lung edema formation in animal models of acute lung injury by inducing

structural changes which decrease vascular permeability to fluid and solute. It organizes actin into a strong cortical ring and strengthens both intracellular and cell-matrix adherence.⁶

An additional role of S1P is the induction of antimicrobial activity in human macrophages that leads to the intracellular killing of nonpathogenic mycobacterium smegmatis and pathogenic *M. tuberculosis*.⁷

Precautions and Disclaimer

This product is for R&D use only, not for drug, household, or other uses. Please consult the Material Safety Data Sheet for information regarding hazards and safe handling practices.

Preparation Instructions

The product is soluble in methanol (1 mg/ml), yielding a clear to slightly hazy solution. The product yields a turbid, colorless solution in water (1 mg/ml), thus water is not recommended as a solvent. Sphingosine-1-phosphate is not soluble or very poorly soluble in petroleum ether, chloroform, acetone, butanol, ethanol, ethyl acetate, dimethyl sulfoxide, and propylene glycol, even upon warming. Although the solubility in methanol is limited, it was the best solvent to store and analyze this lipid.¹

Storage/Stability

Store at $-20\text{ }^{\circ}\text{C}$.

References

1. Van Veldhoven, P. P., et al., A facile enzymatic synthesis of sphingosine-1-phosphate and dihydrosphingosine-1-phosphate., *J. Lipid Res.*, **30**, 611-616 (1989).
2. Spiegel, S. and Milstien, S., Sphingosine-1-phosphate: signaling inside and out., *FEBS Lett.*, **476**, 55-7 (2000).

3. Shatrov, V. A., et al., Sphingosine-1-phosphate mobilizes intracellular calcium and activates transcription factor NF- κ B in U937 cells., *Biochem. Biophys. Res. Commun.*, **234**, 121-124 (1997).
4. Watterson, K.R. et al., The role of sphingosine-1-phosphate in smooth muscle contraction., *Cell Signal.* **17**, 289-98 (2005).
5. Shida, D. et al., Sphingosine 1-phosphate transactivates c-Met as well as epidermal growth factor receptor (EGFR) in human gastric cancer cells., *FEBS Lett.* **577**, 333-8 (2004).
6. Mcverry, B.J. and Garcia, J.G., Endothelial cell barrier regulation by sphingosine 1-phosphate., *J Cell Biochem*, **92**, 1075-85 (2004).
7. Garg, S.K., et al., Sphingosine 1-phosphate induces antimicrobial activity both *in vitro* and *in vivo*., *J Infect Dis*, **189**, 2129-38 (2004).

NDH,PHC 01/05-1

Sigma brand products are sold through Sigma-Aldrich, Inc.

Sigma-Aldrich, Inc. warrants that its products conform to the information contained in this and other Sigma-Aldrich publications. Purchaser must determine the suitability of the product(s) for their particular use. Additional terms and conditions may apply. Please see reverse side of the invoice or packing slip.